

# **Personal Navigation with the Combination of GPS, Mobile Phones and Printed Tourist Maps**

**Rahmi N ÇELİK, Umut UTKAN, Kerem HALICIOGLU and Özgür AVCI, Turkey**

**Key Words:** Navigation, GPS, Bluetooth, Mobile Phone, Map

## **SUMMARY**

Today GPS is one of the most popular positioning systems for navigation in the world. There are many navigation application fields and devices for personal navigation. It is obvious that detail digital maps are the most beneficial tool for much comfortable and reliable navigation in the navigation systems.

However, today it is not easy to find detail or any digital maps every where in the world; but printed maps almost available for every part of the world. More over mobile phones' specifications and integrations with other device such as camera, sound system, GPS and etc. dramatically develop ever new day. It is also said that no mobile phone will be left without GPS integration in Japan in 2007. This also means that soon, GPS will be one of the standards in all type of mobile phones. Therefore mobile phones will generally take the place of handheld GPS receivers and hence not only people who are interested in using GPS and also all the others will have GPS receivers on their hands. This will increase the demand on effective use of GPS receivers for personal navigation on mobile phone technology.

Nevertheless availability of digital maps will not compensate the demands of people as fast as the device development technology. However a man who travels a lot has always chance to find several different version of printed map of the place he visit. Therefore if he has a technology of using his mobile phone with the integration of any of these printed maps he will have the power of navigation almost every where in the world. In this paper an effective way of using printed maps with GPS integrated mobile phones will be explained. The developed software, algorithms, device configuration, user friendly interface and test results on several different maps will also be explained in detail. Moreover the benefits of having such facility on the mobile phone will be discussed on several different types of applications.

# **Personal Navigation with the Combination of GPS, Mobile Phones and Printed Tourist Maps**

**Rahmi N ÇELİK, Umut UTKAN, Kerem HALICIOGLU and Özgür AVCI, Turkey**

## **1. GENERAL CONCEPT**

Today GPS is one of the most popular positioning systems for navigation in the world. There are many navigation application fields and devices for personal navigation. It is obvious that detail digital maps are the most beneficial tool for much comfortable and reliable navigation in the navigation systems. However, today it is not easy to find detail or any digital maps every where in the world; but printed maps almost available for every part of the world. More over mobile phones' specifications and integrations with other device such as camera, sound system, GPS and etc. dramatically develop ever new day. It is also said that no mobile phone will be left without GPS integration in Japan in 2007. This also means that soon, GPS will be one of the standards in all type of mobile phones. Therefore mobile phones will generally take the place of handheld GPS receivers and hence not only people who are interested in using GPS and also all the others will have GPS receivers on their hands. This will increase the demand on effective use of GPS receivers for personal navigation on mobile phone technology. Nevertheless availability of digital maps will not compensate the demands of people as fast as the device development technology. However a man who travels a lot has always chance to find several different version of printed map of the place he visit. Therefore if he has a technology of using his mobile phone with the integration of any of these printed maps he will have the power of navigation almost every where in the world.

In this poster an effective way of using printed maps with GPS integrated mobile phones with Bluetooth technology is explained. The developed software, algorithms, device configuration, user friendly interface and test results on several different maps are also explained in detail. Moreover the benefits of having such facility on the mobile phone are discussed on several different types of applications. More over existence of Google Earth or Map provides excellent support for such approach and system. Therefore support and use of Google Earth or Map are also underlined and explained.

## BIOGRAPHICAL NOTES

**Assoc. Prof. Dr. Rahmi Nurhan Çelik** was taken his BSc. in the [Department of Geodesy and Photogrammetry](#) in [Istanbul Technical University](#) – ITU. In 1987 he began to work as a research associate in the Department of Geodesy and Photogrammetry. Thereafter he has achieved his MSc. degree in 1989 in the Institute of Science and Technology of ITU. In 1992 he was awarded with a national scholarship for PhD education. He has taken his PhD degree in the [University of Newcastle/England](#) in 1996. He is currently working as a Associated Professor in the Division of Geodesy in the Department of Geodesy and Photogrammetry, and he is the Vice Dean of Science and Technology Institute of ITU. He is mainly lecturing on GPS Techniques, Geodetic Network Design, Advanced Electrometry, Geodetic Infrastructure of GIS, Industrial Measurements, C Programming and etc.

He is active member of <http://www.hkmo.org.tr>. There times he was taken the position in the executive board of the Chamber in Istanbul. In between 2000 and 2002 he was in the position of president of the executive board of the Chamber. He actively remains supporting chambers activities and taken position as a string head or a member in the technical commissions, like Earthquakes and Natural Hazards Commission, Geographic Information System Commission, Education Commission and, National Regulation Preparation Commission for Large Scale Map and Map Information Production, etc. He is also the representative of the Chamber in European Group of Surveyors.

**Mr. Umut Utkan (MSc)** graduated from Istanbul Technical University in 2001, with Bachelor of Science Degree in Electrical Engineering. He started developing Power Systems related applications using Java programming language back than. While working toward his Master of Science degree in Electrical Engineering, he continued working on Java applications targeting Power Systems and loss optimizations. He finished his MSc. degree in Electrical Engineering in 2003.

He is currently a doctorate student at Computational Science and Engineering program in Informatics Institute of Istanbul Technical University. His main interest is computational science applications in Electrical Engineering and data mining. While studying towards his degree he started working on GPS related applications. His interest for GPS related applications started growing very fast and currently He is developing a GPS navigation application for Java enabled handhelds.

Developing applications for devices with limited resources is a big challenge for me, now he is developing real time applications and also he is using his computational science and parallel programming background to develop faster and less resource dependent applications. He also interested in data mining, J2EE and architectural design patters in enterprise application development.

**Mr. Özgür Avcı** was born in Bolu in 1979. He graduated from Istanbul Technical University Geodesy and Photogrammetry department at June 2003. He is in graduate program of Bosphorus University Kandilli Observatory and Earthquake Research Institute Geodesy

Department. He is studying on the use of CORS stations in earthquake researches. He is working in a company called System Computer and Technical Services Industry INC. which is representative of Leica-Geosystems about Reference Stations Technical Support. His interests are as follows; he commonly focuses on the use of new techniques and technologies in mapping, navigation and deformation detection. Besides, he is interesting in mapping techniques at Archeological and Architectural sites.

**Mr. Keren Halicioğlu** was born in İzmir in 1979. He graduated from Istanbul Technical University Geodesy and Photogrammetry Department at June 2003. He is in graduate program of Bosphorus University Kandilli Observatory and Earthquake Research Institute Geodesy Department. He is also research assistant in the same department since 2005. He is studying on the network design of campaign based on GPS surveys and conventional surveys about earthquake researches. He is interested in deformation monitoring techniques and the use of surveying and 3D modeling methods for cultural heritage studies.

## CONTACTS

Assoc. Prof. Dr. Rahmi Nurhan Çelik  
Istanbul Technical University  
Department of Geodesy and Photogrammetry Engineering  
Division of Geodesy  
Istanbul  
TURKEY  
Tel.+ 90 212 2853822  
Fax. + 90 212 285 6587  
e-mail: [celikn@itu.edu.tr](mailto:celikn@itu.edu.tr)

Mr. Umut Utkan (MSc), dfgdfgdfgdfgdg  
Istanbul Technical University  
Institute of Science and Technology  
Istanbul  
TURKEY  
Tel.+90 212 2856333  
Fax.+90 212 2856961  
e-mail: [utkanu@itu.edu.tr](mailto:utkanu@itu.edu.tr)

Mr. Özgür Avcı  
System Computer and Technical Services Industry INC.  
Ankara  
TURKEY  
Tel.+90 312 2352011  
Fax.+90 312 2350550  
e-mail: [ozguravci@sistemas.com.tr](mailto:ozguravci@sistemas.com.tr)

Mr. Keren Halıcıoğlu  
Bosporus University  
Kandilli Observatory and Earthquake Research Institute  
İstanbul  
TURKEY  
Tel.+90 216 3080514  
Fax.+90 216 3320241  
e-mail: [kerem.halicioglu@boun.edu.tr](mailto:kerem.halicioglu@boun.edu.tr)